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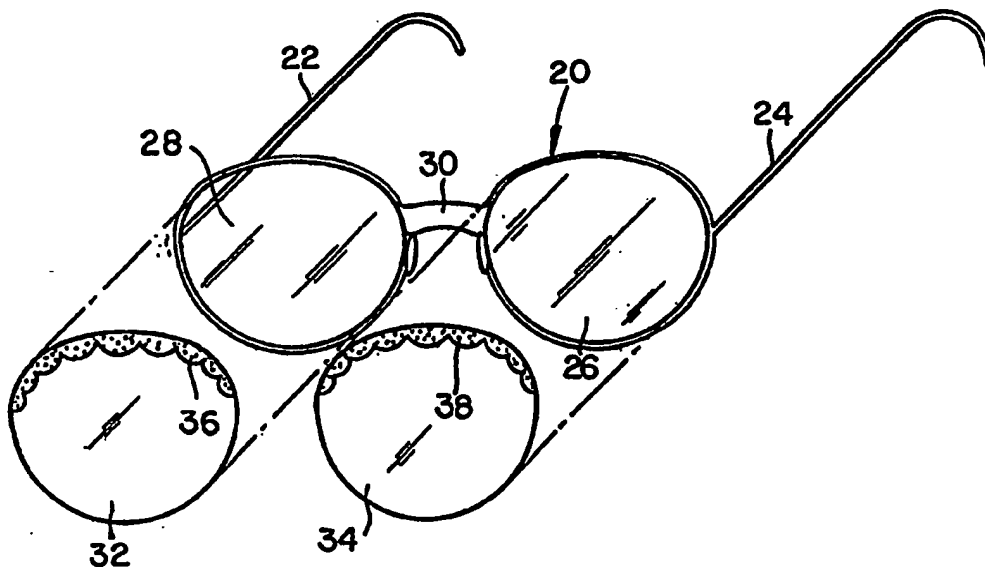
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(54) Title: DISPOSABLE/REUSABLE SUN FILTER



(57) Abstract

A light shield (32 and 34) is provided which includes a relatively thin but preferably rigid body of light permeable material. An arrangement is interposed between the body of light permeable material and one side of the lens (28 and 26) to mount the shield directly on the lens in light intercepting relationship relative to the eye of a user of the lens. The shield (32 and 34) which is preferably mounted in generally cantilever manner on the lens is removable and can be reinstalled repeatedly. Preferably an adhesive is used which provides for a minimum of residue on the lens and the shield is preferably affixed to the lens in such a way that there is a minimum of optical interference.

DISPOSABLE/REUSABLE SUN FILTER

A Light Shield for an Ocular Lens or the Like and Methods Pertaining Thereto.

This invention relates to light shields adapted for use with ocular lenses or the like and to methods pertaining to the manufacture and use of light shields related to ocular lenses and the like.

In researching the novelty of my invention preparatory to filing a patent application therefor, I became aware of the following U.S. Patents: 1,348,713; 1,938,734; 1,968,193; 2,443,918; 2,511,329; 3,033,359 and 3,516,720. In addition, I have since become aware of U.S. Patents 2,759,394 and 4,958,923.

In U.S. Patent 2,759,394, D.L. Evans discloses a substantially complete peripheral application of an adhesive to a glare shield for adhesion to a lens. The design and construction of that combination suffers numerous deficiencies, including that: the prearranged application of glue to be effective for the intended use must conform to the shape of the underlying lens; the almost total circumferential application of glue would cause a significant narrowing of the field of vision of the wearer; the thin application of glue requires almost complete symmetry between the convexity of the lens and the concavity of the shield; the adhesive, being only one strength throughout, will randomly remain on the shield or

the lens upon removal, leaving a residue on the lens and, in addition, allowing the bonding of debris to the lens surface; the lack of airspace between the shield and the lens encourages fogging; no easy way exists for the removal of the shield from the lens; and handling and adjustment of the shield are made difficult by reason of the circumference of sticky glue.

In U.S. Patent 4,958,923, the apparatus for attachment is a structure by which a decorative frame may be snapped onto an underlying eyeglass frame, such that the method of attachment and purpose of the invention are wholly distinct from the invention disclosed herein.

It is an object of the invention to provide an improved sunfilter for use with eyeglass or ocular lenses.

It is another object of the invention to provide for readily employed sunfilters which facilitate handling and adjustability and need not conform to the shape of the supporting lens.

It is another object of the invention to provide an improved sunshield which is capable of repeated use in connection with an associated ocular lens while avoiding the adhesion of debris on the eyeglass lens.

Yet a further object of the invention is to provide an improved sunshield for use with optical lenses in a manner which does not detract from visual quality and aesthetic appearance and which provides for avoiding fogging.

Yet another object of the invention is to provide an improved lightshield for optical use which can be manufactured and employed at relatively low cost.

Still another object of the invention is to provide an improved relatively inexpensive lightshield which is convenient to market, store and use.

Another object of the invention relates to the provision of an improved lightshield which does not sacrifice vision quality and provides for ready removal.

A further object of the invention is to provide for the conversion of non-prescription glasses into reading or bifocal eyeglasses.

In achieving the above and other objects of the invention, a lightshield is provided which is adapted for being mounted on one side of a two-sided lens. The shield includes a relatively thin but relatively rigid body of shape retaining light-permeable material with means being interposed between this body and one side of the lens to mount the shield directly on the lens in light intercepting relationship relative to the eye of the user of the lens.

According to features of the invention, the shield may be provided in planar, concave or convex form. Moreover, according to a preferred embodiment of the invention, the shield will be supported in generally cantilever manner directly on the lens although possibly additionally resting at certain points on the lens.

In accordance with a preferred feature of the invention the shield will be provided with a raised adhesive strip or

strips, pad or pads or platform or platforms of limited area permanently affixed to or integral with the shield and containing on the exposed surface, a non-permanent adhesive which will permit affixation of the shield to an associated eyeglass lens. Preferably, the adhesive will be located outside of the effective or major field of vision of the lens so as to not obstruct vision materially.

According to another feature of the invention, the adhesive employed in accordance therewith is of a material adapted to permit ready adhesion and removal of the shield from the lens while leaving substantially no residue thereupon. Moreover, the adhesive will permit ready and multiple removals of the shield from the lens and reinstallations of the shield on the lens. As will be seen hereinafter, the means spaces the body of the shield from the lens at least in part.

The body of the sun shield may have a thickness in the order of magnitude of 1/4 millimeter to 2 millimeters although a thickness of up to 4 millimeters is possible. Moreover, the means may advantageously be a strip or pad having a thickness of, for example, from 1/2 to 3 mm. and a width in the order of magnitude of 1/8 to 3/8 of an inch, but may be greater or smaller depending on the configuration of the means, the size and weight of the shield and the anticipated stresses on the shield.

According to another feature of the method of the invention, the adhesive may be formed as a backing on a strip which adheres thereby directly to a peripheral portion of the

lens as noted hereinabove. Alternative to the strip, there may be employed a plurality of pads or islands with an adhesive being formed as a backing thereon on one or both ends thereof.

The above and other objects, features and advantages of the invention will be found in the description which follows hereinafter as illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is an exploded view of a pair of spectacles or eyeglasses illustrating how light shields will be mounted on the respective lenses thereof in accordance with the invention;

Fig. 2 is a view of the spectacles of Fig. 1 with the light shields mounted directly on the lenses thereof;

Fig. 3 is a diagrammatic view illustrating a particular arrangement for mounting a light shield on a lens in accordance with the invention;

Fig. 4 is a modification of the installation illustrated in Fig. 3;

Fig. 5 is a further modification of the installation illustrated in Figs. 3 and 4;

Fig. 6 is a still further modification of the installation for mounting a light shield of the invention on a lens;

Fig. 7 is a view corresponding to Figs. 3-6 showing a further embodiment for mounting a light shield on a lens;

Fig. 8 is a modification of the structure illustrated in Fig. 7;

Fig. 9 is still a further modification of a lens and shield combination corresponding to Figs. 3-8;

Fig. 10 is still a further modification of an installation of a light shield of the invention on a lens;

Fig. 11 is side view of a light shield installed in accordance with the invention on a lens;

Fig. 12 is a is a modification of the structure shown in Fig. 11;

Fig. 13 is a modification of the structure shown in Figs. 11 and 12;

Fig. 14 is a modification of the structure shown in Figs. 11-13;

Fig. 15 is a further structure in side diagrammatic view corresponding to Figs. 11-14;

Fig. 16 illustrates diagrammatically an embodiment wherein adhesive on a mounting pad is protected when not in use;

Fig. 17 illustrates diagrammatically one possible mounting of light shields of the invention on a packing card;

Fig. 18 illustrates a dispenser rack for light shields of the invention,

Fig. 19 is a diagrammatical front view illustrating a further embodiment adapted for mounting a light shield on a lens in accordance with the invention;

Fig. 20 is still another modification corresponding to the view shown in Fig. 19;

Fig. 21 is still another embodiment of the invention corresponding to Figs. 19 and 20; and

Fig. 22 illustrates in exploded view a further utilization of the invention in the form of a combination of an eyeglass frame and shields.

Other objects, features and advantages of the invention will be apparent from the detailed description which follows hereinbelow.

The invention provides, in accordance with one aspect thereof, preshaped individual concave and/or convex sunfilter shields (generally used in pairs) made of rigid but relatively thin plastic or other suitable material with a raised strip or strips of double adhesive backed tape or pads running roughly horizontally along the upper inner or outer surface of the sunfilter lens or placed on the inner or outer surface of each of the extreme peripheries of the upper two quadrants of the shield. One side of the adhesive strip or pad is preferably permanently attached to the sunfilter lens. The other side of the tape or pad may permit a secure but non-permanent fixing of the sunfilter shield directly to the corresponding lens of the prescription eyeglasses. The non-permanent adhesive of the strip or pad is strong, yet will leave little or no residue on the prescription lens upon subsequent removal of the sunfilter shield. The adhesive will also permit many installations and removals of the sunfilter shield without losing its adhesive quality. Its modest cost will also place it in the disposable category.



The placement of the strip(s) or pad(s) is important to avoid material interference with the normal field of vision. Placement in the manner illustrated herein will achieve minimal interference and easy removal. Nevertheless, the illustrated manner of placement of the adhesive strip(s) or pad(s) provides for secure adherence of the sunfilter lens or shield and, because of the thickness of the strips or pads, optimizes the suitability of the sunfilter shield for use with a wide range of prescription lens convexities.

In some areas, the thickness of the raised strip or pad may have the effect of forcing another part of the sunfilter shield against the prescription lens. The smaller the spacing that is provided between the sunfilter lens and the prescription lens, the better will be the clarity of vision and acuity through the two. Moreover, the use of a reasonably wide but still non-obstructive strip or set of strips or pads provides excellent stability for the sunfilter shield.

As noted above one configuration of the strip or pad is a crescent-shaped or substantially rectilinear strip (in one version scalloped) running along the inner or outer surface of the upper periphery of the shield. An alternative is a horseshoe-shaped or semi-circular strip framing the top and upper inner or outer surface peripheries of each shield. Such shapes permit proper adhesion to the prescription lens or its frame in cases where it is desirable to minimize the width of the strip or pad or for other circumstances. Such adhesive strips or pad arrangements can also be scalloped for good aesthetic and mechanical strength purposes or arranged in

other positions on the sunfilter shield as long as there is only minimal, if any, obstruction of the field of vision.

The sunfilter shield can be made in a wide variety of shapes and colors (normal and vibrant colors as well as metallic silver and so forth) to permit not only functional benefits of the invention but also stylistic effects. Such effects can result from overlaying a larger (or even smaller) sunfilter lens on a smaller (or larger) prescription lens or even a lens of a different shape to achieve a certain aesthetic look. A variety of fashion colors would make it possible to match different clothing or other accessories to achieve different looks or moods.

The adhesive strips or pads referred to above would be coated on the side to be affixed to the prescription lens with a non-permanent adhesive substance such as that made or used by 3M for its double adhesive "Removable Mounting Squares", its "Post-It" squares, or its colors tabs. The adhesive used or made by Anchor Wire Corp. or by Elco Industries, Inc. of Goodlettsville, TN 37072 in its double adhesive Mounting Tape, or those adhesives supplied by Precision Packaging Products, Inc. under the name EZE-STICK, or others, can also be used. Whatever non-permanent adhesive is used should permit easy removal and be a low or non-residue material. It should further be non-marring, non-messy and reasonably durable. The adhesive should perform well (i.e., maintain its adhesiveness and the above enumerated qualities) in a wide range of outdoor temperatures, as well as in a wide range of sunlight, moisture and wind conditions. Such adhesives today are commercially

available. The other side of the adhesive strip or pads will be permanently affixed to the sunfilter shield with a permanent-type adhesive available from Precision Packaging Products, Inc. or others or by being integral with the shield or lens.

The material of the strip or pads includes polyethylene, polyfoam, or other types of foam, felt, silicone or other semi-soft/semi-rigid compressible materials to allow distancing of the sunfilter lens from the prescription lens at the upper portion of the lens or elsewhere where the strip or pads may be placed. The materials of the above-mentioned Mounting Tape or the Removable Mounting Squares are examples of suitable materials for the strips or pads.

The strips or pads may also be made as part of the sunfilter shield itself, being then of the same plastic or other shield material. This raised portion of the lens will then be coated with the non-permanent adhesive which will permit affixing and removal, as in the case of the adhesive strips or pads, to the prescription or optical lens.

The plastic or other material of the sunfilter shield referred to above can be made in concave form (on the side fitting over the prescription or optical lens) and/or convex (on the other side) and is preferably rigid.

An alternative to the convex shape of the sunfilter lens is a flat lens of limited flexibility. Such a lens would need to be further distanced by the strip(s) or pad(s) (i.e., by greater depth of the strip(s) or pad(s)) to allow the lens to lie relatively parallel to the prescription lens.

The appearance of the outline of the strip or pads from an on-looker's perspective could be minimized by the narrowness of its width and the coloration or relative transparency of the strip or pads and of the sunfilter shield itself. There is preferred a darker shade of the sunfilter color in the area of the strip(s) or pad(s) to camouflage the outline. Alternatively or additionally, a tradename, corporate name, logo or other marking could be imprinted so as to appear at the top of the sunfilter shield in front of the strip(s) or pad(s) located in that position.

The thickness of the strip(s) or pad(s) can be selectively varied, although a suitable thickness would be in the order of 1/2 mm. to 1 mm. and up to 3 mm., with, in the case of a strip (or lateral pad), a width in the order of magnitude of about 1/8 to 3/8 of an inch and a length sufficient to extend across the top of the sunfilter (lens) shield or other areas of placement as described above. The thickness of the sunfilter shield is preferably in the order of magnitude of about 1/4 millimeter to 2 millimeters, although a thickness of up to 4 millimeters may be useful. The above dimensions, while being preferred, do not limit the scope of the invention. Different dimensions, placement, or shapes of the strip(s) or pad(s) may also be appropriate for aesthetic reasons. Different lens weights or configurations may further be useful for different purposes as long as the appropriate functions are provided.

Another purpose of the invention is the protection of prescription and optical lenses to avoid their being marred or

damaged in certain commercial, industrial or recreational environments. Thus, the invention can provide an inexpensive and readily available shield-like protection in such applications.

For packaging and preservation prior to first use, the exposed surfaces of the strip or pads are preferably covered with a protective coated paper, film or other material employing a silicone release system or other system such as that used with the 3M, Anchor or Elco products mentioned above. This material can be peeled off to expose the adhesive surface just prior to affixation. An alternative would be to allow some similar material to be used for or as part of a backing card as part of the packaging which is employed.

A measuring diagram can be printed on the front of the packaging or the sunfilter shield itself could be used (while packaged in shrink wrap plastic, for example) to allow a potential customer to measure his or her prescription lens' shape and convexity against the contours of the sunfilter lens in the package. All that a customer would need to do for this purpose would be to place the lens of his or her prescription glasses over the diagram on or actual shape of the sunfilter shield contained in the package. Some other simple set of diagrams or measuring device (e.g., a three point device used to measure concavity by opticians) might alternatively be placed on the packaging or in a rack display. The color of the shield can also be indicated on the packaging.

Another application of interest deriving from the invention is the use of a prescription lens affixed as

aforesaid as an overlay to an individual's eyeglass, whether prescription or not. The overlay would thus change the individual's prescription. An example of this application might be the use of a lens having a magnification or bifocal reading lens in its lower half, such that application of that lens over the individual's non-prescription sunglasses would enable the individual to read the small print of a map, menu or document.

Referring next to the drawings, Fig. 1 illustrates a pair of spectacles 20 having templepieces 22 and 24 and prescription lenses 26 and 28 or the like mounted in a frame including a connecting bridge 30. Fig. 1 also illustrates independent and separate sunfilter eye shields 32 and 34 which are of a material which will intercept light passing through the spectacles to the eyes of a user and which will modulate the light passing through such as by cutting down the amount of ultraviolet or infrared light or other areas of the spectrum as may be required. As noted hereinabove, the shields 32 and 34 may be employed for other purposes such as for example by preventing dust and wind from passing through to the lenses 26 and 28 and by protecting the lenses 26 and 28 from damage such as scratching or from the depositing of a residue of any type thereupon.

The light shields 32 and 34 are illustrated as having scalloped strips 36 and 38 mounted thereupon. The eyeglass lenses naturally have two sides, an outer side and the inner side which is proximate the eyes of the user. In the illustrated embodiment, the shields 32 and 34 are intended to

be installed upon the outer sides of the respective lenses by means of the strips 36 and 38 which are adhered to the shields and which are provided with a non-permanent adhesive backing which permit the shields to be installed upon the lenses 26 and 28 as illustrated more particularly in Fig. 2.

In Fig. 2 it will be noted that shields 32 and 34 are mounted respectively on the associated lenses with the strips 36 and 38 occupying peripheral portions thereof. As discussed here-in-above the lenses 26 and 28 have effective fields of vision with the strips 36 and 38 being of such size as to avoid interfering with the respective fields of vision. Where each lens has a determinable range of effective area, the respective shields will be of an area constituting at least 50% of the lowest area in this range. Moreover, the adhesive which connects the strips and thereby the shields to the lenses will preferably contact the lenses over less than about 20% of the area of the same.

The adhesive which is employed to attach the strips and hence the shields to the lenses has been discussed here-in-above. Preferably this adhesive will permit ready installation of the shields upon the lenses and ready removal of the shields from the lenses and will permit repeated use while leaving a minimum of residue upon the associated lenses. Moreover, the adhesive will preferably be light transparent so that, should there be the slightest residue left upon the lenses, there will be no interference with the visual acuity permitted by the same.

Fig. 3 illustrates an embodiment of a sunshield 40 wherein the strip 42 is of semi-circular shape. The strip 42 may be provided with a double backing of adhesive in order to adhere to the associated lens and also to adhere to the shield 40 itself. The strip 42 may be of a material of the above noted type but may alternatively be of the same material as that which constitutes the shield 42 and may be integral therewith with the exposed side being coated by a non-permanent adhesive of the above-noted type. It will be apparent from the illustration that the strip occupies a peripheral portion of the shield 40 and will occupy only a relatively small peripheral portion of the lens to which it will be affixed. Alternatively, the body of the strip 42 may be affixed to the lens and will have an adhesive portion thereon which will be adhered to the shield 40.

Fig. 4 illustrates the strip 44 in horseshoe shape having extremities 46 and 48 which will extend down along the lateral peripheries of the shield 49 and as well along the lateral portions of the associated lens. The strip 44 may take any of the forms described above relative to Fig. 3 and will only occupy a relatively small peripheral portion of the lens and shield.

Fig. 5 illustrates a strip 50 of arcuate shape. As in the foregoing embodiments, the strip 50 may be of a material having its opposite faces covered with an adhesive in order to be able to stick to the shield 52 as well as non-permanently to the lens to which it is to be affixed. It may also have the other forms indicated above.



Fig. 6 illustrates the strip 54 as being of generally rectilinear shape and as adhering to the shield 56. Once again, the strip may take one of the various forms indicated above by being adhesively affixed thereto or being integral therewith.

Fig. 7 illustrates the supporting mechanism of the invention in the form of pads or islands each of which has a body and having its respective faces either permanently or non permanently adhesively affixed to the shield 58. In this embodiment, the pads or islands are indicated at 60, 62 and 64 which may be integral with or attached to the shield 58. It will be noted that these pads or islands are positioned at the apices of an imaginary triangle which is formed thereby. Another triangular arrangement is illustrated in Fig. 8 wherein are shown the pads or islands 66, 68 or 70 attached in triangular relationship to the shield 72.

The embodiment in Fig. 9 illustrates a clear and bifocal arrangement along line 74 of the shields 76, an arcuate or semi-circular strip being illustrated at 78 to provide for attachment to a lens. This embodiment provides for prescription correction below or above line 74 to operate in conjunction with the associated lens.

In the embodiment of Fig. 10 which illustrates a shield 80, the strip 82 is of scalloped form. In addition to being decorative, this strip permits of additional clear vision relative to a covering of the lens by the shield and strip.

In Fig. 11 is illustrated a prescription lens 84 and a shield 86 mounted directly on the glass or plastic of the lens

by means of a strip or support 88. The shield 86 is thus mounted in generally cantilever fashion forming a cantilever foundation (with lens contact at various points depending on the respective lens and shield configuration and the concavity/convexity thereof) and is itself concave to receive within its concavity the lens 84. The shield 86 spaced along its entire length from the associated lens as indicated by arrows 90. The spacing is in the order of magnitude, of 1/2 mm. to 5 mm. with a preferred range of from slightly greater than 0 to 3 mm.

In Fig. 12, the horseshoe shaped strip 92 is of the type mentioned hereinabove. It supports the shield 94 in cantilever relationship with the lens 96 and the shield is spaced from the lens along the entire length thereof as indicated above.

Fig. 13 illustrates one of a plurality of pads such as indicated at 98. This may be according to the two pad relationship illustrated in Figs. 7 and 8 and involves once again a shield 100 mounted in cantilever fashion directly on a lens 102. The shield may be spaced therefrom along the entire length thereof.

Fig. 14 illustrates a variation of Fig. 13 in that a plurality of pads or islands 104 and 106 are shown supporting a shield 108 on a lens 110 in cantilever manner. In the embodiments of Fig. 12-14, the shields may be regarded as being of concave or convex shape depending on the aspect from which viewed. Provision may also be made to mount these shields on the interior surfaces of the lenses (i.e., on the

concave surfaces thereof) so that it is the lens which shields the shield from the elements rather than vice versa.

Fig. 15 illustrates a generally planar shield 112 mounted by a strip or pad 114 on a lens 116. In this case the shield 12 makes contact with the lens 116 as shown at 118 and, while being of generally cantilever type support has some of its surface supported by the lens 116 itself.

Fig. 16 illustrates that a strip or pad 120 may have its adhesive backed surface 122 protected by a removable sheet of paper or the like indicated at 124 to protect the adhesive surface 122 from collecting lint, dust and other such contamination. The removal of the backing or covering 124 from the strip or pad 120 permits the associated shield (not shown) to be affixed to an associated lens.

Fig. 17 illustrates that two or more shields 126 and 128 can be mounted on a packing card 130 for removal therefrom. The surface of the card 130 can be plasticized or coated with a substance such as silicone or other such substance to permit a ready removal of these shields or filters from the card 130 for application to a lens. Card 130 may be adhesively backed to allow mounting the same for example, on the dashboard of an automobile.

In Fig. 18 is illustrated a dispenser rack 132 having wells 134, 136 and 138 in which are stacked a plurality of light shields provided in accordance with the invention. The dispenser rack 132 may be employed for purposes of marketing. Such a rack may also be utilized in an automobile or other such vehicle or the like to provided for the ready

accessibility of the optical shields, which themselves are indicated for example at 140.

Referring next to Figs. 19-21, there will be seen other modifications and variations of the invention constituting additional embodiments thereof. In Fig. 19 is illustrated a shield 284 having a strip of arcuate configuration thereupon as indicated at 286. As in the prior embodiments of the invention, the strip 286 will have on its opposite faces adhesives which are preferably of different strengths. Thus, on one side of the strip 286 will be an adhesive which is non-permanent or removable adhesive whereas preferably the adhesive on the side bonding to the shield 284 will be a permanent adhesive. Fig. 20 illustrates a shield 288 having two pads or islands 290 and 292. Adhesive will be applied to the opposite faces of these pads as referred to hereinabove with reference to Fig. 19. Fig. 21 illustrates a shield 294 with a pad 296 having adhesives on the opposite faces thereof in the same manner as has been previously described.

Fig. 22 illustrates still a further embodiment of the invention in which it is not necessary to employ a lens, the shields in this embodiment being utilized without prescription lenses and for decorative purposes or for sunblocking purposes or the like. In Fig. 30 appears a frame 360 having semi-circular rims 362 and 364 connected by bridge 366 and constituting a part of the frame. Also shown are ear or temple pieces 368 and 370. The rims 362 and 364 have platforms or extensions 372 and 374 depending therefrom. It is on these extensions that shields 376 and 378 are mounted by

employment of the strips or pads 380 and 382 having adhesive on opposite faces thereof in the form which has been mentioned hereinabove. The extensions would be placed to correspond to the strips or pads on the shields or vice versa.

In accordance with the invention, where the lenses have an effective field of vision, the connecting mechanism is preferably located substantially outside of this field. The adhesive employed will permit ready and multiple removals of the shield and reinstallations of the same on the associated lens.

As has been noted, the non-permanent adhesive referred to above may be of a material selected from the group consisting of non-permanent removable or temporary adhesives as used in 3M's "Removable Mounting Squares", "Post-It" Squares or color tabs or in Elco Industries, Inc.'s or Anchor Wire Corp.'s double adhesive removable "Mounting Tape" or other such adhesives having temperature service ranges of at least 10-120°F. These may include a synthetic rubber or latex based, removable adhesive with low moderate initial tack but having high holding power and removing cleanly with little or no residue, having a service range of at least 0-120°F, and known as EZE-STIK or Precision Packaging Products Inc. #328.

The permanent adhesive referred to above may be a synthetic rubber or latex based, permanent adhesive with good adhesive wet out, high initial tack, good shear values, high ultimate adhesion having a service range of at least 0-120°F and being used on a tape known as EZE-STIK or Precision Packaging Products Inc. #'s 9332, 9316 or 9308 with a tensile

strength (lbs/in. width carrier only) respectively at 1/32" of 5#-6#, at 1/16" of 9#-10# and at 1/8" of 12#-13#, with an adhesion (oz/in width) of 100 min. (PSTC#1) and a shear of (hrs.) 500 + (PSTC#7).

As indicated above, any of a variety of commercially available pressure sensitive adhesives which are removable without leaving a significant amount of adhesive residue, even after extended exposure to heat and light can be used in practicing the invention. Such adhesives will preferably have a peel force of less than about two (2) pounds. A pressure sensitive adhesive as employed is one which bonds almost instantaneously when contact pressure is applied to force the mating surfaces together. Such adhesives have a cohesive strength such that, if the adhesive is peeled away from a smooth surface to which it has adhered, no apparent offsetting occurs and no appreciable residue remains on the smooth surface. The tack will be relatively non-aggressive and ordinarily will not be sensed until some pressure is applied to the surface of the pressure sensitive adhesive, causing it to 'cold flow' in the manner of most viscoelastic materials. The pressure sensitive adhesive may be applied to the substrate or strip, pad or platform by coating from an organic solvent based solution, coating from a suspension or dispersion such as an aqueous latex, or coating or extruding a hot melt pressure-sensitive composition.

As mentioned, there can be employed an adhesive used in the double adhesive removable Mounting Tape distributed by Anchor Wire Corp. or Elco Industries, Inc. or by Precision

Packaging Products, Inc. as #328 and known under the tradename EZE-STIK or used in Minnesota Mining and Manufacturing Company's double adhesive Removable Mounting Squares or in its Post-it squares or tabs.

Pressure sensitive adhesives can be used which are based on organic solvent solutions of natural or synthetic rubber tackified by some type of resinous material. There can also be used removable adhesive as described in Patent 3,922,464 assigned to Minnesota Mining and Manufacturing Company, St. Paul, Minnesota dated November 25, 1975. This adhesive is a stable viscous polymer latex formed from monomers of major amounts of alkyl acrylates, minor amounts of emulsifier monomers, and, if desired, minor amounts of zwitterionic monomers, the water being evaporated from the latex to leave a tacky and pressure-sensitive adhesive. The desirable attributes of the pressure sensitive adhesive include availability in latex form, stability at widely varying temperatures even when subjected to mechanical movement, a high enough latex viscosity to permit a uniform and predictable layer of adhesive to be applied, maximum predictability of characteristics from batch to batch, minimization of staining, and the fact that adhesion does not increase to the point where the pad or platform to which it is applied cannot be removed cleanly. The latex will have a sufficiently high viscosity (e.g., 500-2000 cps) to permit the coating on of a layer which, after evaporation of the water, may range up to 5 mils (about 125 microns) in thickness.

The above described pressure sensitive adhesive may be a copolymer adhesive of monomers, 100 parts by weight of adhesive consisting essentially of (a) 88-99 parts by weight of at least one terminally unsaturated vinyl monomer, (b) 0.2-5 parts by weight terminally unsaturated vinyl monomer, (b) 0.2-5 parts by weight of at least one emulsifier monomer and (c) 0-10 parts by weight of at least one zwitterionic monomer, the total of (b) and (c) being 1 to 12 parts by weight. In one composition, the terminally unsaturated vinyl monomer amounts to 95-98 parts by weight and the emulsifier monomer amounts to at least one part by weight. In such an adhesive, 70-100 weight percent of the terminally unsaturated vinyl monomer is selected from the class of non-tertiary alkyl acrylates wherein each alkyl group has at least half of its carbon atoms in a single chain and the average length of the alkyl chain is more than 4 and not more than 12.

For various reasons it may be desirable to incorporate, as part of the terminally unsaturated vinyl monomeric portion of the adhesive system, any of the several modifying comonomers which are not emulsifier monomers. Acrylonitrile imparts firmness and solvent resistance, styrene and alpha-methyl styrene impart firmness and improve peel adhesion, t-butyl styrene improves tack, methylmethacrylate makes the adhesive firmer, octyl vinyl ether softens the adhesive, vinyl acetate improves adhesion to certain plastics surfaces and so forth.

A pressure sensitive adhesive can be used which includes between 45 wt. and 85 wt. % of a copolymer of propylene or



ethylene with an aliphatic hydrocarbon having an open chain configuration with between 5 and 7, preferably 6, carbon atoms. The copolymer is preferably amorphorous propylene-hexene. The pressure sensitive adhesive also includes liquid and solid tackifiers, and may include U.V. stabilizing and anti-oxidant material. The copolymer consists essentially of an olefinic hydrocarbon of from 2 to 3 carbon atoms and an open chain aliphatic hydrocarbon having from 5 to 7 carbon atoms.

The percentage of the various materials may vary, but for one type of hot melt adhesive, useful ranges of weight percentages for the materials would be as follows:

Copolymer	45%-85%
Solid Tackifier	5%-35%
Liquid Tackifier	4%-24%
Anti-Oxidant	0.1%-2%
U.V. Absorber and Stabilizer	0.05%-1%

For permanent pressure responsive adhesives, higher amounts of copolymer and the solid tackifier can be used, while for removable pressure sensitive adhesives, lower percentages of the copolymer and solid tackifier would be used, with higher percentages of the liquid tackifier.

Instead of hot melt application, the adhesive could also be applied at room temperatures, using solvents such as toluene, methyl ethyl ketone (MEK), ethyl acetate, heptane, or other solvents. The basic composition would be as set forth above, but 30% to 50% of solvent would be employed. Reference is made to Patent 5,262,216 November 16, 1993 (G. Popat) for a

further description of the characteristics of this pressure sensitive adhesive.

The designation "permanent adhesive" in Patent 5,262,216 is applied to adhesives having a peel force in the order of 3 pounds or more, while pressure sensitive adhesives having a peel force of less than about two pounds are referred to as removable (non-permanent) adhesive coatings.

An adhesive substance in the nature of a removable plastic adhesive is also useable such as (but not limited to) that sold under the tradename UHU HOLD-IT and made or supplied by Eberhard Faber, Inc. Oakville, Ontario, Canada L6H 5R6 and Lewisburg, TN 37091 or acrylic adhesive or adhesive of any other material having a light to moderate initial tack with moderate to high holding power and which removes cleanly with little or no residue.

The details of adhesives as referred to herein are not intended to be limitative of the invention but merely illustrative of some forms which would be useful in practicing the invention. Thus, according to some preferred embodiments, the pads, strips or other structures interposed between the lens and shield will preferably have a permanent adhesive on one side and a non-permanent or removable adhesive on the other side (i.e., removable from the lens). In still other embodiments, the non-permanent adhesive can be used on both sides to permit removal of the interposed structure from the shield as well.

Additional embodiments of the invention involve arrangements wherein the shield is mounted in the concavity of

the associated lens rather than on the convex side. Specifically, lens may be with a shield of the above noted type, there being interposed between the lens and shield a strip or pad having adhesive thereon in the nature of what has been described above. The lens has a shield associated therewith on the concave side of the lens with a strip being interposed between the two in the manner described above.

The shields which have been mentioned throughout this description may be of various materials but are preferably of a shape retaining configuration. The sunfilter shields as used herein may be made of:

1. Acrylics and plastics, such as but not limited to:
  - (i) polymethyl methacrylate (sometimes known as "PMMA",
  - (ii) Columbian Resin 39 (known as CR 39),
  - (iii) ABS Resins composed of acrylonitrile, butadiene and styrene, including methyl methacrylate,
  - (iv) polycarbonates, or
  - (v) coated acrylics or polycarbonates with silicones or other materials for scratch resistance, including but not limited to polysiloxane resins or other rigid silicones,
2. Glass including that which is known as "crown glass", and
3. Other suitable materials or combinations of the foregoing which generally will have the ability to transmit a high percentage of total light.

There will now be obvious to those skilled in the art many modifications and variations of the embodiments of the

invention described above both relative to the method and to the product. These modifications and variations will not depart from the scope of the invention if defined by the following claims or if equivalent thereto.

CLAIMS

1. A light shield adapted for being mounted on a two-sided lens, said shield comprising a relatively thin but rigid body of light permeable material, and means interposed between said body and one side of the lens to mount the shield directly on said lens in light intercepting relationship relative to the eye of a user of said lens, said means including opposite surfaces and an adhesive on each of said surfaces, said adhesives being of different adhesive strengths.
2. A light shield as claimed in claim 1, wherein said means supports the shield in generally cantilever manner on said lens.
3. A light shield as claimed in claim 1, wherein said means includes an adhesive of a material adapted to permit ready removal of said shield from said lens while leaving substantially no adhesive residue on said lens.
4. A light shield as claimed in claim 1, wherein said means includes a pad which is at least substantially rectilinear, arcuate or oval in shape and extends along the upper extremity of one side of the body.
5. A light shield as claimed in claim 4, wherein said means spaces said body from said lens at least in part.
6. A light shield as claimed in claim 4, wherein said pad has a thickness of 1/2 to 3 mm. and a width in the order of magnitude of 1/8 to 3/8 of an inch.

7. A light shield as claimed in claim 6 wherein the adhesive which affixes the pad to said lens has a peel force which makes it a non-permanent adhesive and the adhesive which affixes the pad to said shield has a peel force which makes it a permanent adhesive.

8. A method comprising directly mounting a light permeable shield on an ocular lens in spaced relationship therewith relative to at least a major portion of the lens, the shield being mounted directly on the lens by adhesives formed as backings on a strip or pad and one of which is adhesive in removable manner to an upper peripheral portion of the lens.

9. A method as claimed in claim 8, wherein adhesives are formed as a double backing on opposite sides of the strip or pad and with a weaker adhering relation to the lens than to the shield.

10. A method as claimed in claim 8, wherein the strip or pad is employed to support the shield on the lens in a generally cantilever manner.

11. A light shield adapted for being mounted on a support, said shield comprising a relatively thin but rigid body of light permeable material, and means interposed between said body and said support to mount the shield directly on said support in light intercepting relationship relative to the eye of a user of said support.

12. A light shield as claimed in claim 11, wherein said support is an eyeglass frame.

13. A light shield as claimed in claim 12, wherein said frame has at least one semi-circular rim and a platform on each said rim to which said shield is adhered by said means.

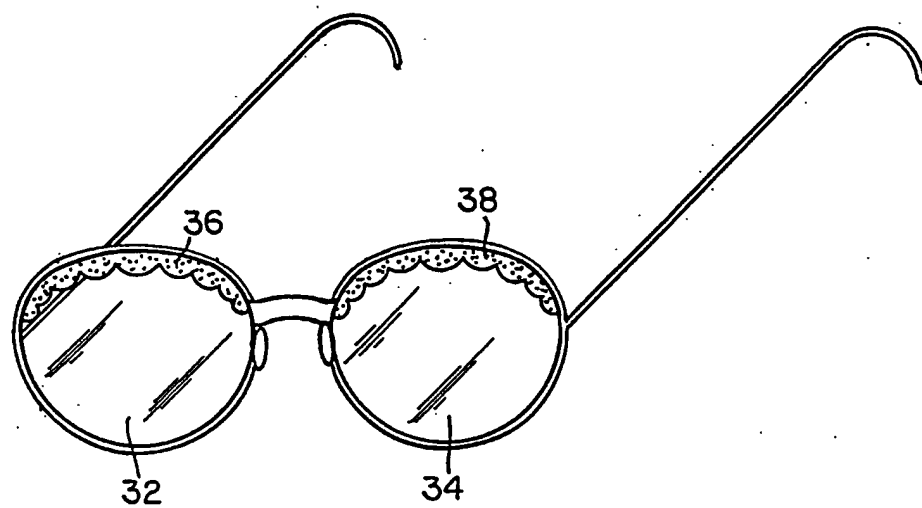
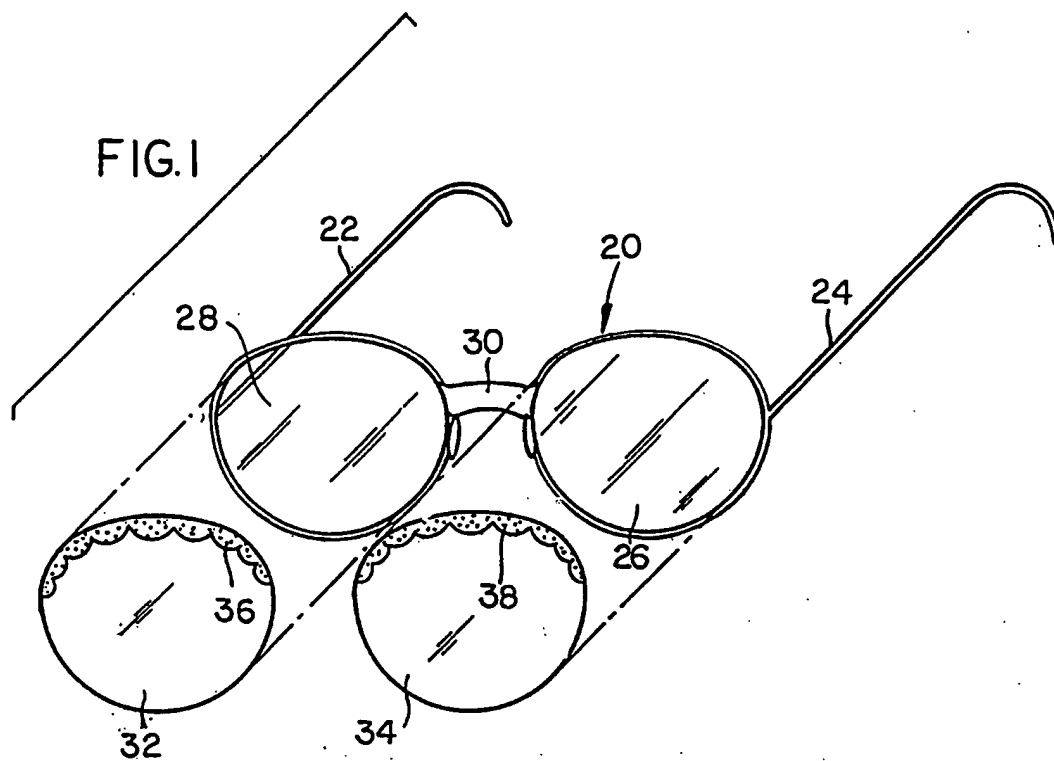


FIG. 2



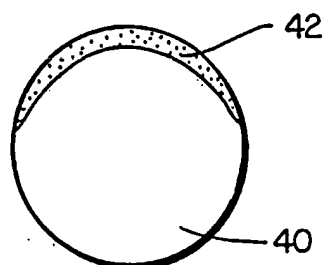


FIG. 3

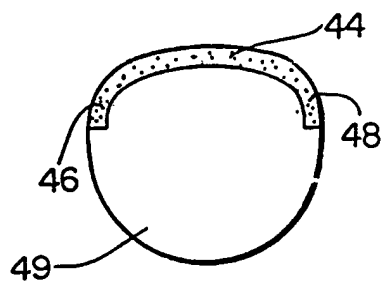


FIG. 4

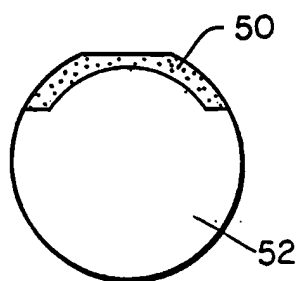


FIG. 5

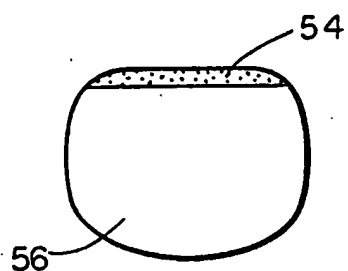


FIG. 6

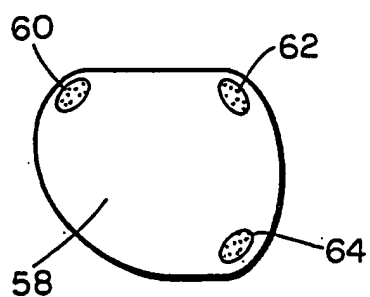


FIG. 7

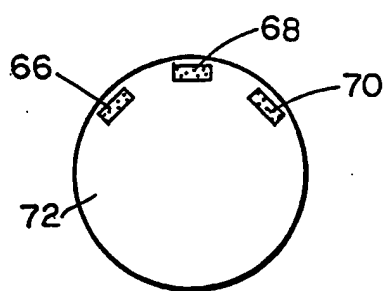


FIG. 8

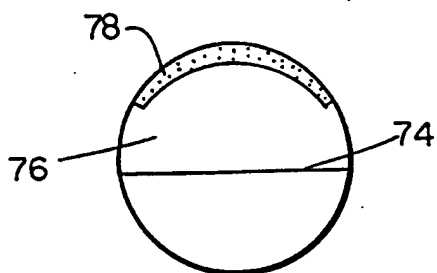


FIG. 9

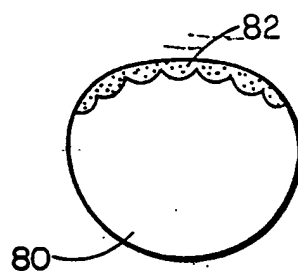


FIG. 10

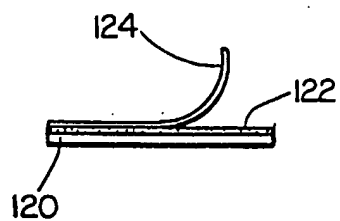
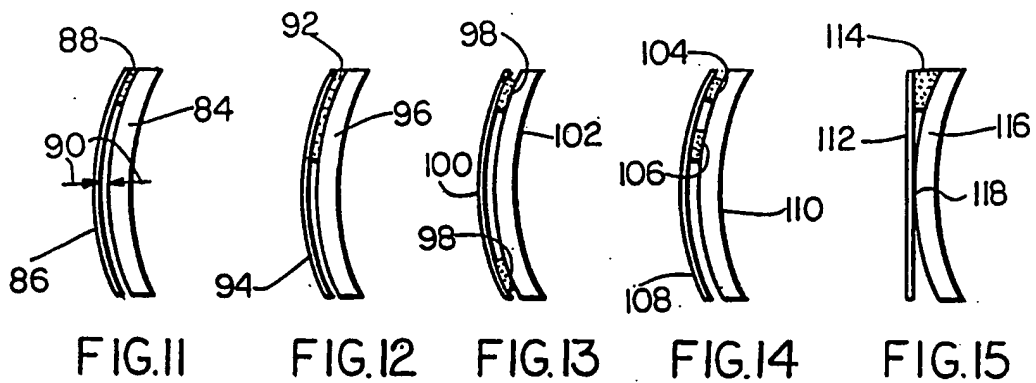


FIG. 16

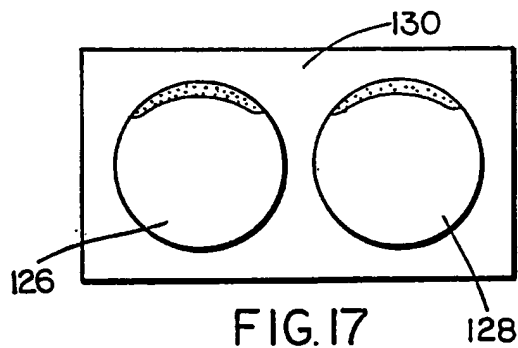


FIG. 17

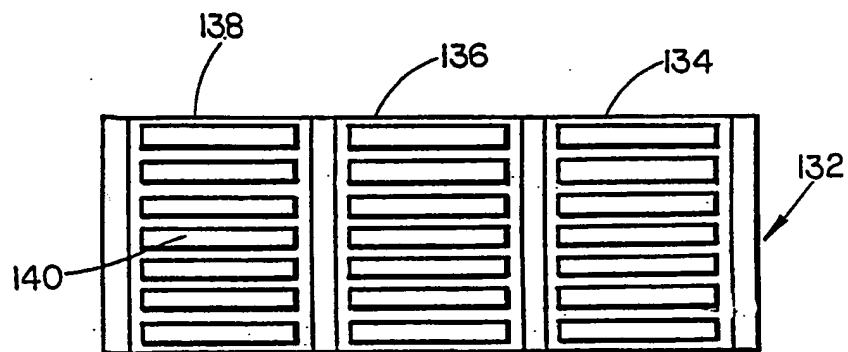


FIG. 18

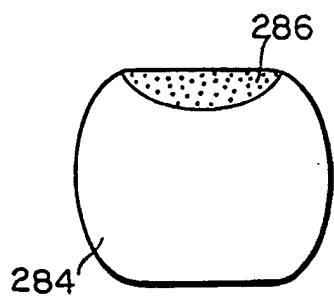


FIG. 19

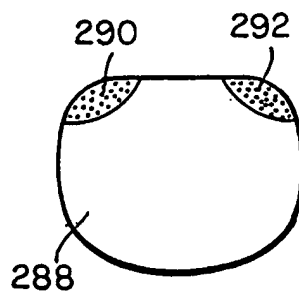


FIG. 20

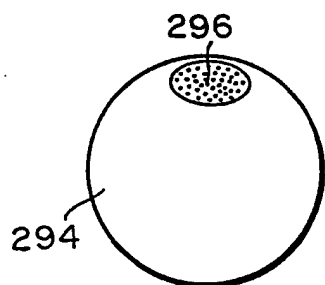


FIG. 21

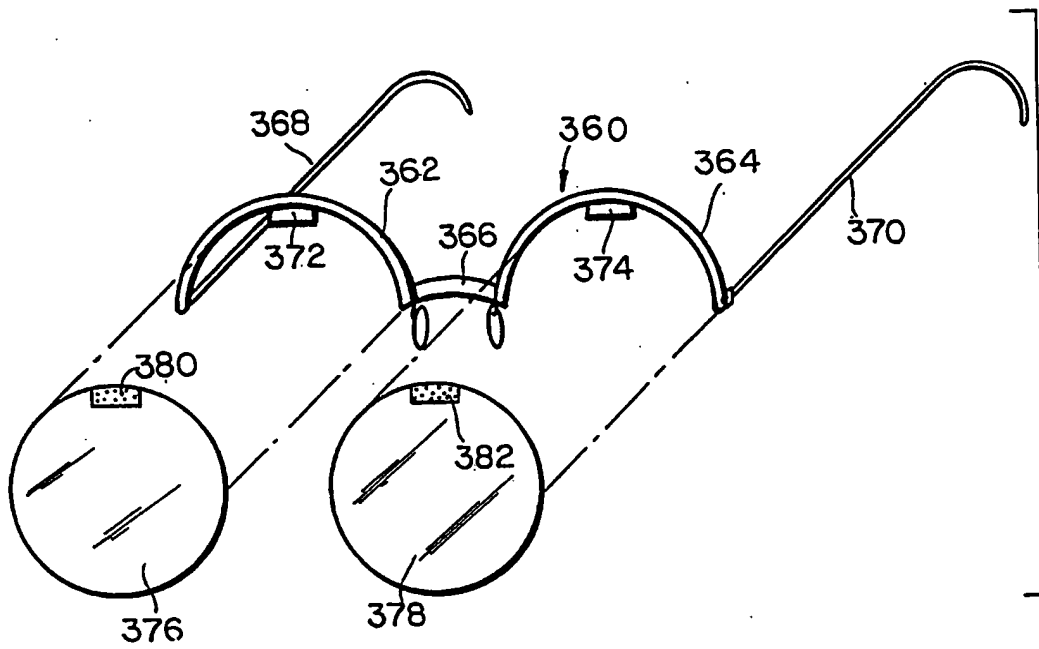


FIG. 22